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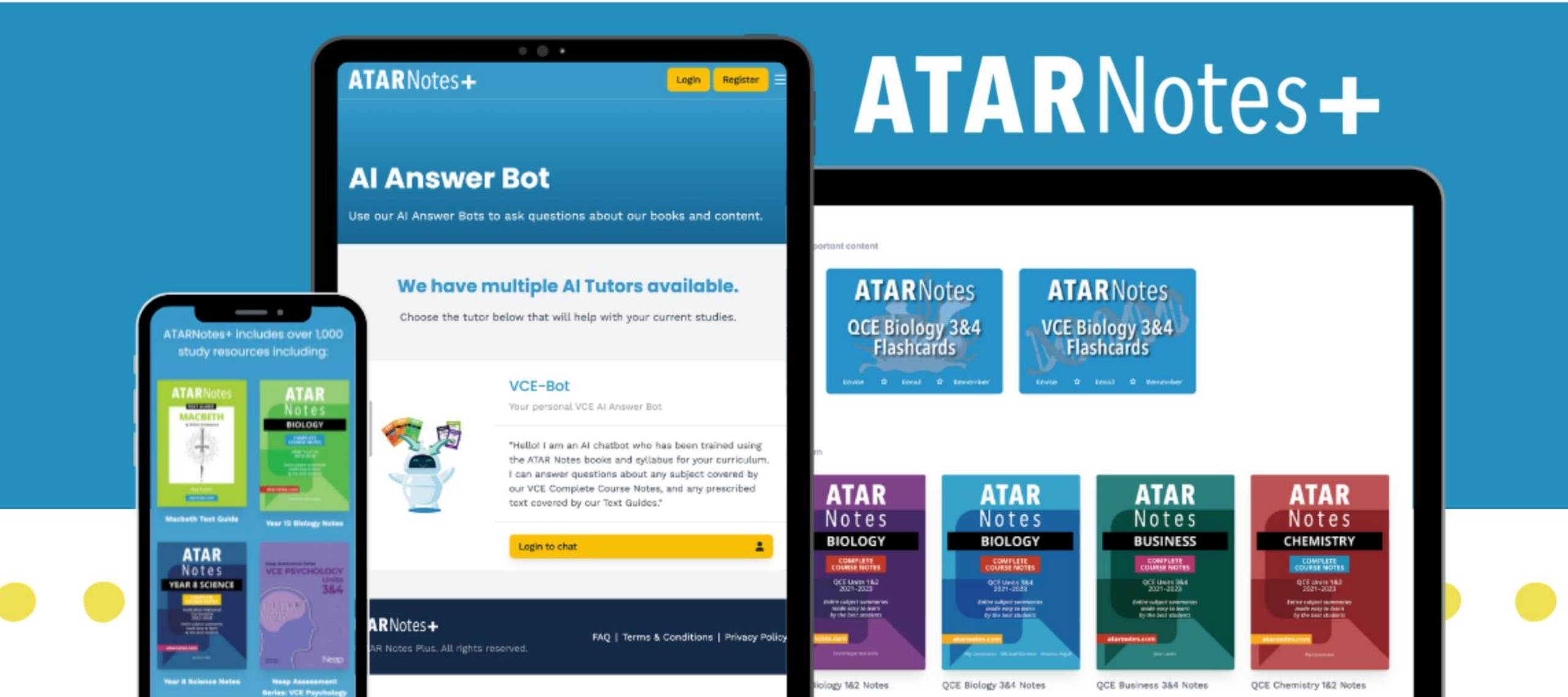

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Psychology 3&4

Presented by:
Sunny Norkute

About Me!

- Sunny Norkute
- Graduated in 2021
- ATAR – 96.70
- Study score of 47 in Legal Studies, and 40+ study scores for Literature, English, Further Maths and Psychology
- Studying a Bachelor of Paramedicine at Monash University

Psychology 3&4 Lecture

Lecture Outline

- Two content blocks
- Go through an area of content
- Tips for each section
- Q&A throughout

WARNING: We will be moving through content pretty quickly

The lecture slides are available for download from the current page

Quick Overview

Unit 3

- Nervous System
- Stress
- Learning
- Memory

Unit 4

- Sleep
- Mental Health
- Specific Phobias

Unit 1-4

- Research Methods

Three Top Tips

1 – Don't Worry Too Much About Definitions

- There are no 'set' VCAA definitions
- Questions do not ask you to 'define something' (e.g. define classical conditioning)
- If you know the content, you will be able to make up a reasonable definition anyway (if you had to)

2 – Do Practice Questions

- Practice questions are the best way to study
- Practice exams are the best way to prepare for the real exam
- The more you do, the better off you will be

3 – Create Your Own Resources

- Generally works better than relying solely on external resources
- Helps condense information – there is a lot of useless stuff in the textbook that isn't examinable
- Chapter summaries are a great fit for Psych

Nervous System

- *"The roles of different subdivisions of the central and peripheral nervous systems in responding to, and processing and coordinating with, sensory stimuli received by the body to enable conscious and unconscious responses, including spinal reflexes" (VCAA Study Design)*

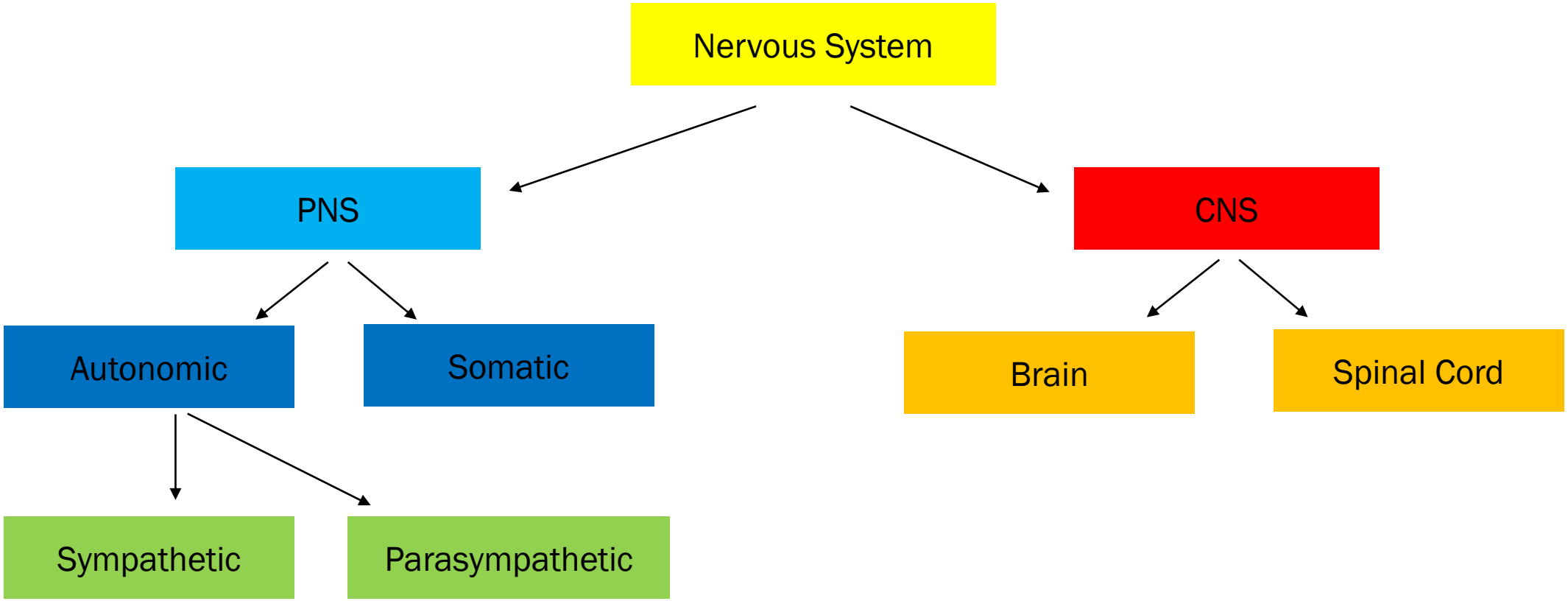
- The nervous system is the communication system within your body. It connects the body's internal organs and cells with the external world

- The nervous system receives information, processes information and coordinates a response to that information

- It is made up of several different branches, or sub-systems, including the central nervous system (CNS) and the peripheral nervous system (PNS)

Nervous System

Divisions



Nervous System

Divisions

Central Nervous System

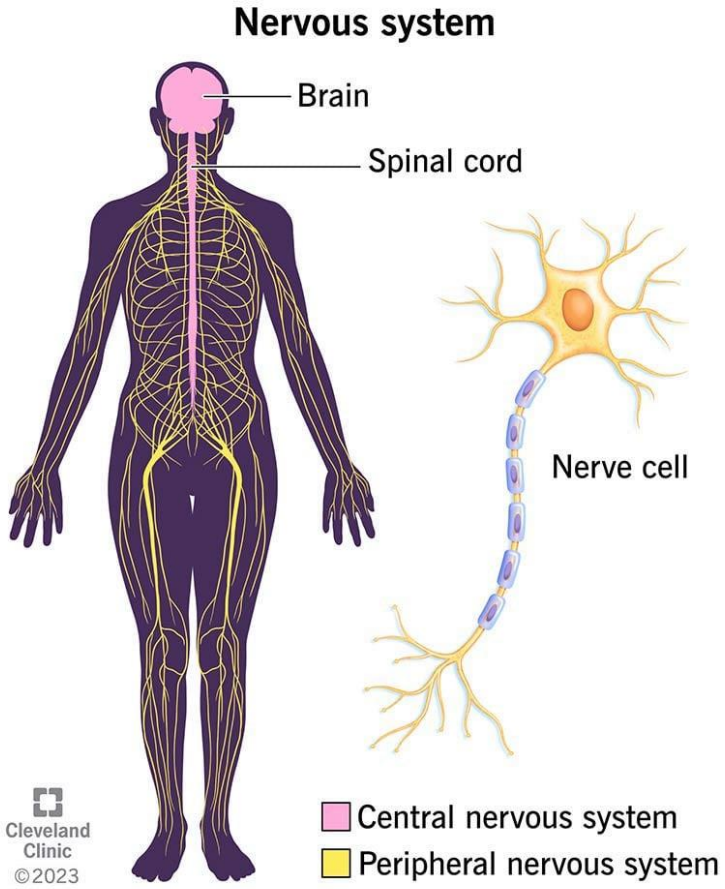
- Sends and receives messages to and from the PNS

Brain

- Processes sensory information
- Coordinates a response to that information

Spinal Cord

- Connects the brain to the PNS
  - Receives sensory info from PNS and sends to the brain (up the spinal cord)
  - Receives motor information from the brain and sends it to various parts of the body using the PNS (down the spinal cord)



Nervous System

Divisions

Peripheral Nervous System

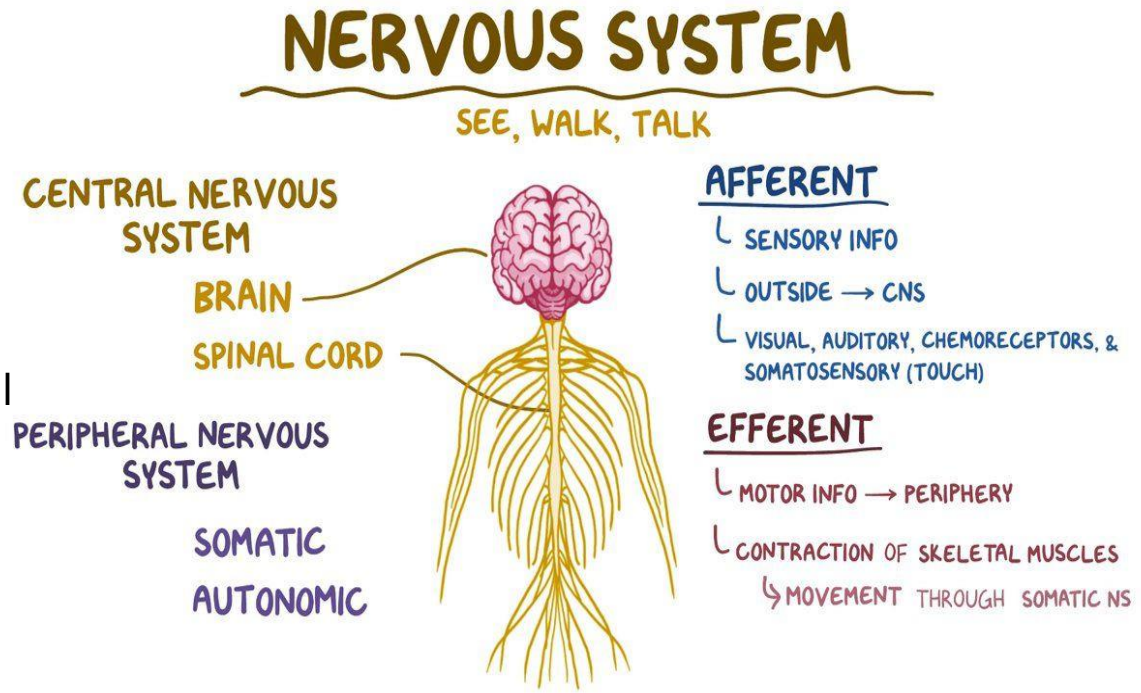
- Made up of the entire network of nerves outside the CNS
- Carries sensory information to the CNS
- Carries motor information from the CNS

Somatic Nervous System

- Initiates skeletal movement
- Carries sensory information to the CNS (neural pathways are afferent/towards)
- Carries motor information from the CNS (neural pathways are efferent/away from)

Autonomic Nervous System

- Connects CNS to internal organs and glands
- Self-regulating/automatic (not under voluntary control)
- Regulates the muscles controlling organs (known as visceral muscles)



Autonomic Nervous System

Sympathetic Nervous System

- Increases activity of most of the body's muscles, organs and glands (stimulates)
- Prepares the body for action
- Fight-flight-freeze response
- Triggered by a stressor/fear stimulus
- Releases hormones such as adrenaline, from the adrenal glands
- Heart rate and breathing rate increases

Parasympathetic Nervous System

- Decreases activity (peace)
- Calms the body after action
- Dominates the sympathetic nervous system most of the time (during routine, everyday activities)
- Takes longer to return the body to its normal state as it has to remove hormones from the bloodstream

	SYMPATHETIC	PARASYMPATHETIC
Pupil	*Dilates* to allow more light to enter the eye	*Contracts*
Salivary Glands	*Decreases* salivation	*Increases* salivation
Lungs	*Expand* to help increase breathing rate	*Contracts*
Heart	Heart rate *increases*	Heart rate *decreases*
Stomach	*Decreases* contractions related to digestion	*Increases* contractions related to digestion
Intestines	*Decreases* contractions related to digestion	*Increases* contractions related to digestion
Gall Bladder	*Inhibits* the release of bile	*Stimulates* the release of bile
Liver	*Increases* the release of blood glucose	*Decreases* the release of blood glucose
Adrenal Glands	*Stimulate* release of hormones	*Inhibits* release of hormones
Bladder	*Relaxes*	*Contracts*

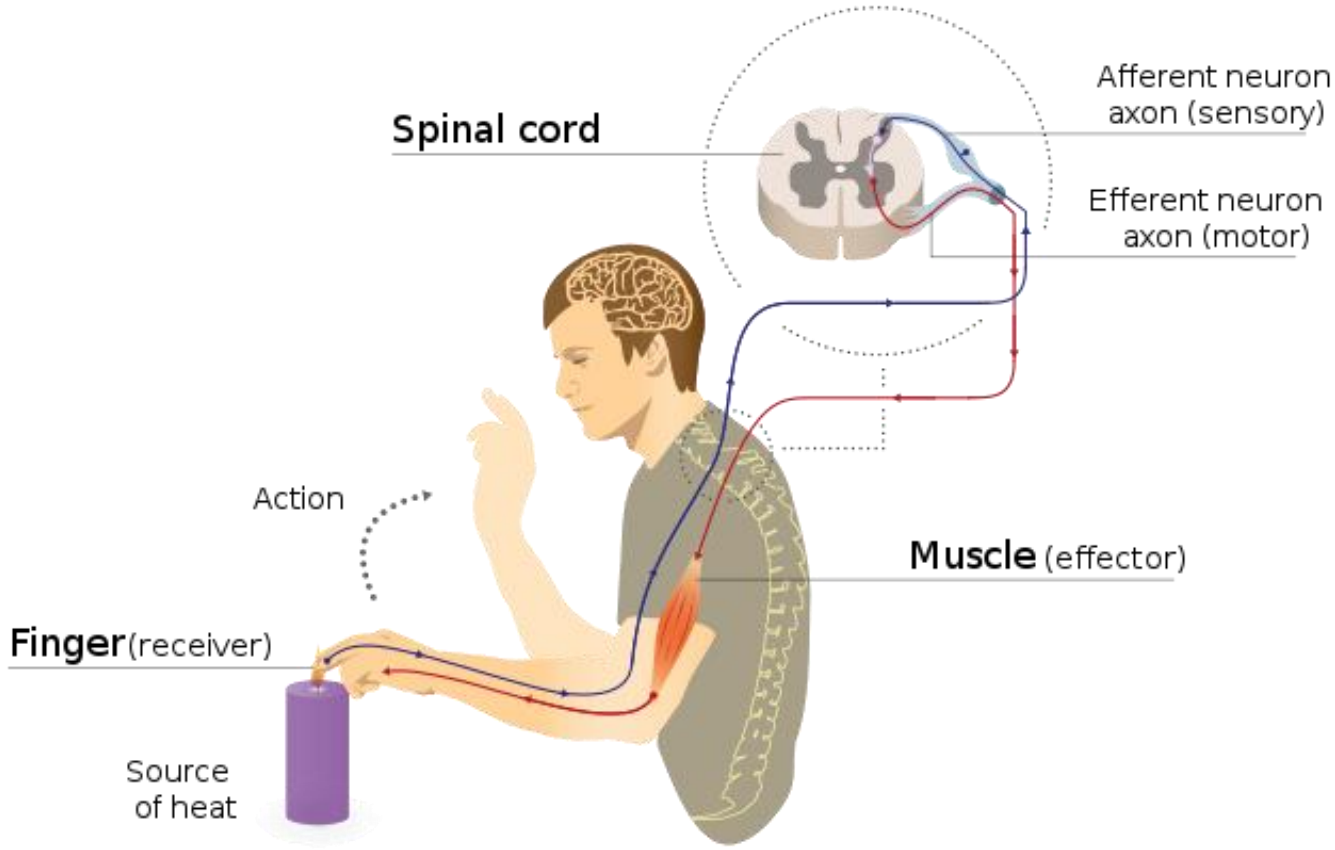
Responses

- A conscious response to a sensory stimulus is a reaction that involves *awareness* and is *voluntary*. It usually happens after you have paid attention to the stimulus
  - For example, if the sun is shining brightly, you might put on sunglasses

- An unconscious response to a sensory stimulus is a reaction that *doesn't involve awareness*. It is *involuntary* and automatic. These are generally controlled by the autonomic nervous system, and include functions such as blinking, or your heart beating. Sometimes they are reflexive responses, when there isn't enough time to make a conscious response

- A spinal reflex is an *unconscious* and *involuntary* response that occurs automatically to certain stimulus, without any involvement of the brain. This allows for a faster reaction time in potentially harmful situations
  - For example, if you touch something hot, you will pull your hand away immediately, without the sensory information actually travelling all the way to the brain

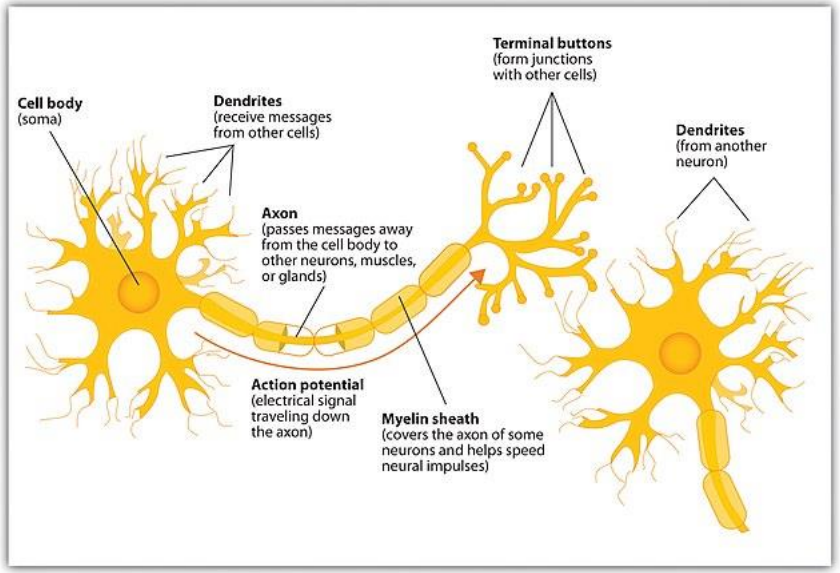
Spinal Reflex



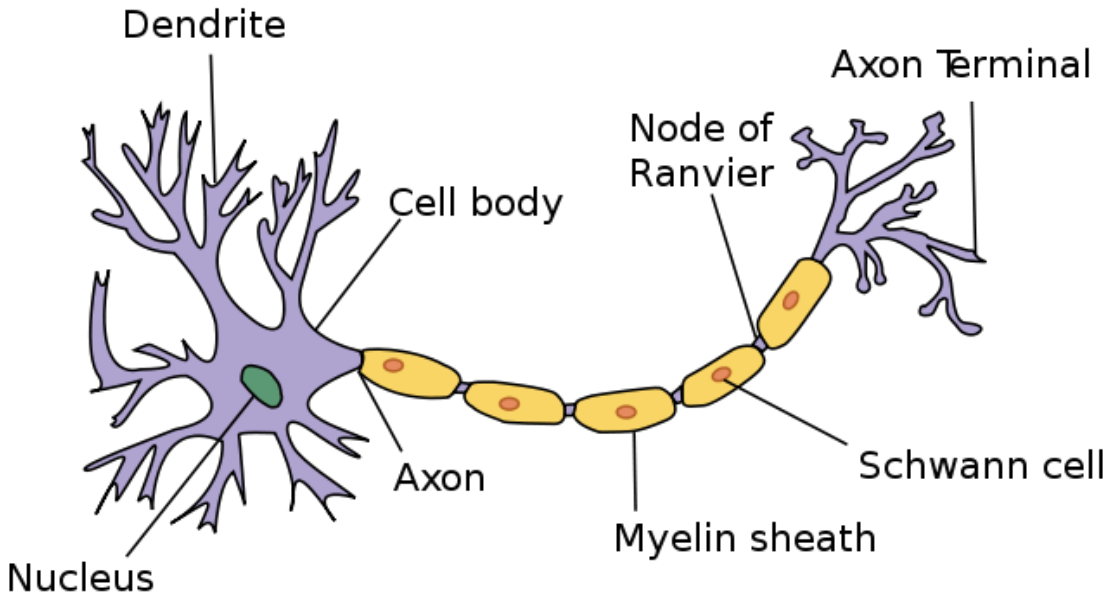
Neurons

- *"The role of neurotransmitters in the transmission of neural information across a neural synapse to produce excitatory effects (as with glutamate) or inhibitory effects (as with gamma-amino butyric acid [GABA]) as compared to neuromodulators (such as dopamine and serotonin) that have a range of effects on brain activity" (VCAA Study Design)*

- A neuron is an individual nerve cell that is specialised to receive, process and transmit information to other cells in the body



Parts of a Neuron



Dendrites – extensions of a neuron that receive information from other neurons. A neuron may connect with thousands of other neurons

Axon – a single extension that transmits information to other neurons or cells

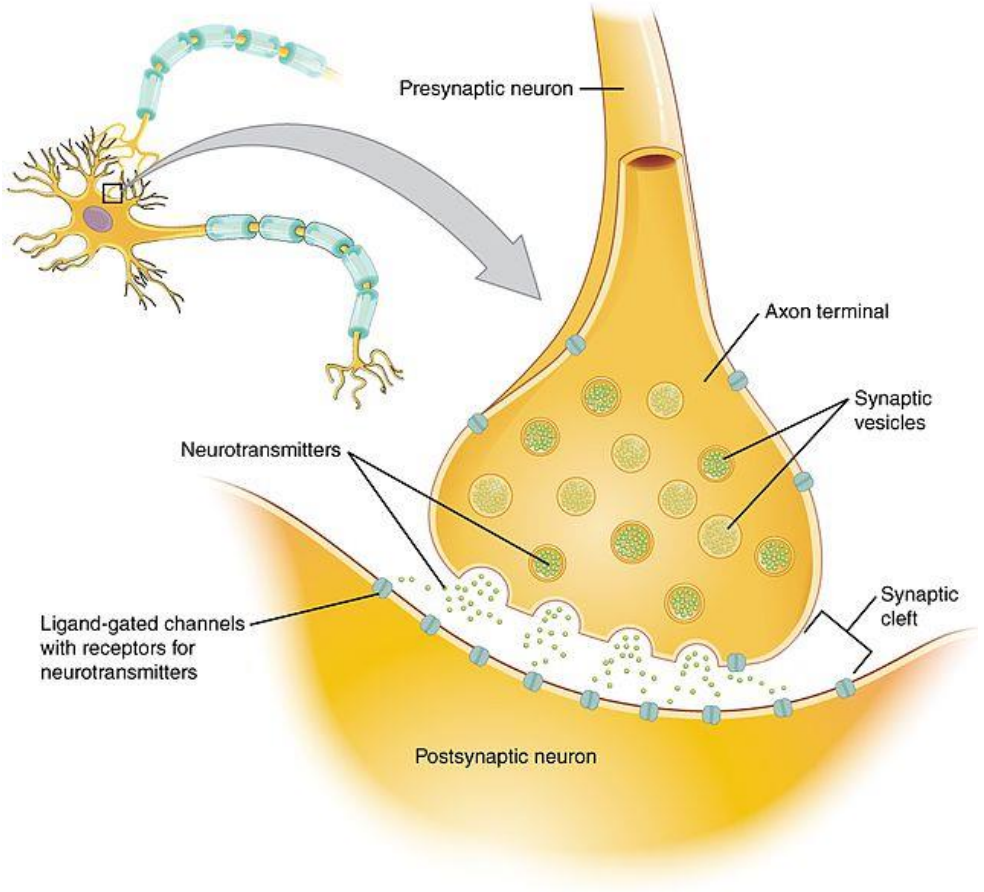
Myelin – a white, fatty substance that surrounds and insulates the axon. The myelin sheath allows messages to travel faster through the neuron and protects the message from interference

Axon Terminals - At the end of an axon there are small branches called *axon collaterals.* At the end of these collaterals are *axon terminals*. Each axon terminal has a small swelling at the tip called a *terminal button*. The terminal button is where neurotransmitters are stored and released from, which allows neurons to communicate their messages with other neurons

Parts of a Neuron

Axon Terminals –. Each axon terminal has a small knob-like swelling at its tip called a terminal button. The *terminal button* is a small structure that secretes neurotransmitters, which carries its chemical message to other neurons or cells. Also known as synaptic vesicles

Synaptic Gap – The synaptic gap is a tiny gap (about 500 times thinner than a human hair) between the dendrites of one neuron and the terminal buttons of another neuron. It is part of the synapse, which is where communication between two neurons occurs



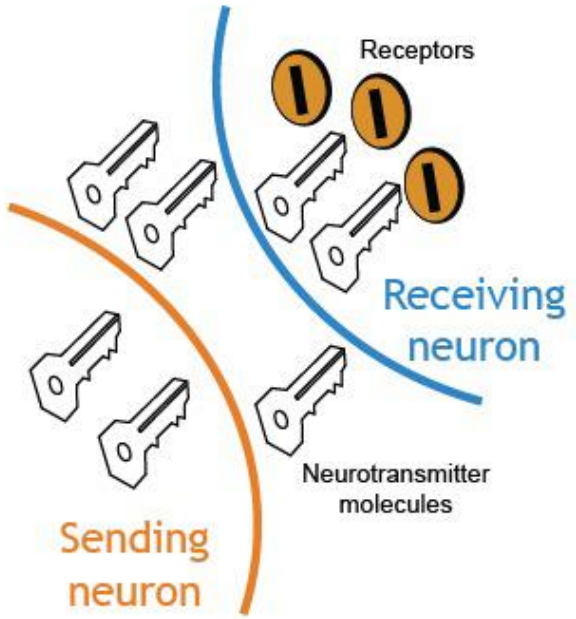
Neurotransmitters

- Neurotransmitters are a chemical substance produced by a neuron that carry a message to other neurons or cells. When carrying a message to another neuron, neurotransmitter works by attaching themselves to *receptor sites of postsynaptic neurons*. The neuron that releases the neurotransmitter is called the *presynaptic neuron*
  - Any neurotransmitters that don't bind to receptors in the postsynaptic neuron are absorbed back into the terminal buttons of the presynaptic neuron. This is called *reuptake*
- Neurotransmitters either have an excitatory effect (stimulating postsynaptic neurons to fire) or an inhibitory effect (preventing postsynaptic neurons from firing)
- Glutamate is the main *excitatory* neurotransmitter in the CNS. This means that glutamate enhances information transmission by making postsynaptic neurons more likely to fire. It is associated with increases in learning and memory
- GABA is the main *inhibitory* neurotransmitter in the CNS. It works throughout the brain to make postsynaptic neurons less likely to fire

Neurotransmitters

'Glutamate = Go, GABA = Slow'

- Different types of neurotransmitter have different shapes. When released by the presynaptic neuron, a neurotransmitter searches for the correctly shaped receptor site on the dendrites of the postsynaptic neuron. Like a key in a lock, a neurotransmitter's shape must precisely match the shape of the receptor site on the postsynaptic neuron's dendrites. This is why chemical neurotransmission is often referred to as a ***'lock-and-key process'***



- Substances that *increase* the receptiveness of the dendritic receptors to a particular neurotransmitter are known as agonists
- Substances that *decrease* the receptiveness of the dendritic receptors to a particular neurotransmitter are known as antagonists

Neuromodulators

- *Dopamine* is a neurotransmitter that is important for balance, movement, pleasure + rewarding behaviours. It is a neuromodulator, meaning that it can lead to both excitatory + inhibitory effects
  - can be released from a neuron far from its receptor site
  - influence effects of other chemical messengers

- *Serotonin* is a neurotransmitter (that also acts as a hormone) and is important for mood and sleep
  - the 'feel-good' hormone

Synaptic Plasticity

- *"Synaptic plasticity – resulting from long-term potentiation and long-term depression, which together act to modify connections between neurons (sprouting, rerouting and pruning) – as the fundamental mechanism of memory formation that leads to learning" (VCAA Study Design)*

- Neurons are living cells, that can change their size and function. They can also change their connections with other neurons.

- Neural plasticity is the ability of the brain's neural structure or function to be changed throughout the lifespan, generally through experience. Neural plasticity is the basis of learning and memory

- During learning and memory, changes occur at the synapse (the tiny gap between neurons). Synaptic plasticity refers to the ability of the synapse to change over time

Nervous System

- *Sprouting* is the formation of new neural connections to create new synaptic pathways
- *Rerouting* is the establishment of an alternate synaptic pathway to avoid damaged neurons
- *Pruning* is the removal of unnecessary synapses in order to make useful neural pathways more efficient

Long-term Potentiation + Depression

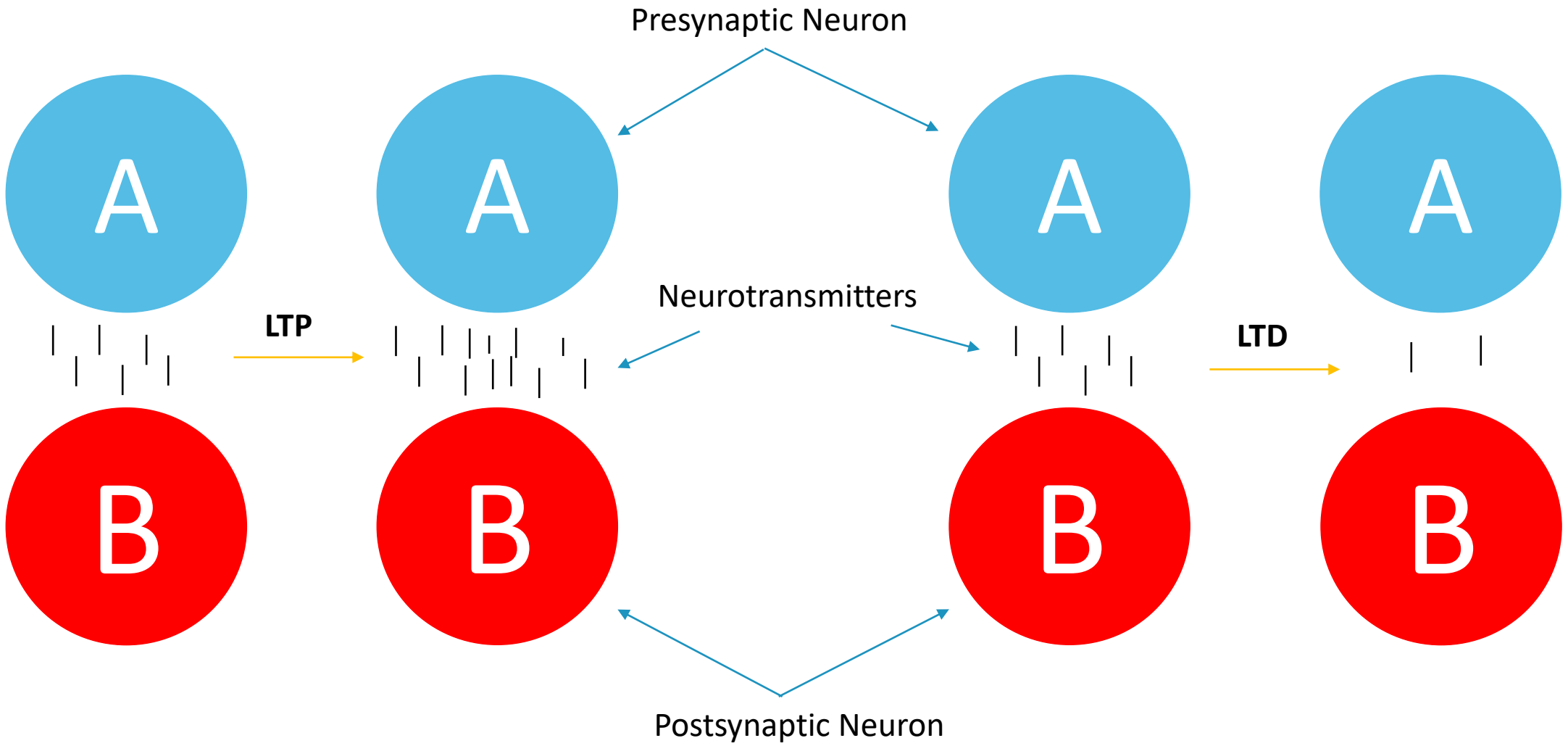
- Long-term potentiation (LTP) refers to the long-lasting *strengthening* of synaptic connections. This results in more effective synaptic transmission between the neurons. The postsynaptic neuron becomes more and more responsive to neurotransmitters released by the presynaptic neuron. This occurs because of **repeated activation** of the two neurons together

- Long-term depression (LTD) is a long-lasting *decrease in the strength* of synaptic connections. It is the opposite of long-term potentiation. This results from a continued **lack of stimulation** between neurons. The postsynaptic neuron becomes less and less responsive to neurotransmitters released by the presynaptic neuron

- LTD is believed to be just as important for learning and memory as LTP. The weakening / loss of unused synapses (through LTD) gets rid of unwanted connections. This leaves only the important connections, that have been strengthened through repeated use by LTP.

- The process basically occurs to the rule 'use it or lose it'

Long-term Potentiation + Depression



Stress

- *"Internal and external stressors causing psychological and physiological stress responses, including the flight-or-fight-or-freeze response in acute stress and the role of cortisol in chronic stress" (VCAA Study Design)*
- Stress is defined as a state of physiological and psychological arousal produced by internal or external stressors that are perceived by the individual as challenging or exceeding their ability to cope
- A stressor is a stimulus that causes stress
- Stress is commonly associated with being a bad thing. However, in psychology, stress can be good or bad
- Acute stress is stress that provides high levels of arousal for a short amount of time.
- Chronic stress is stress that involves high levels of arousal + persists for a long period of time. It is harmful to one's wellbeing

Fight-Flight-Freeze Response

- The fight–flight–freeze response is an *involuntary, physical response* to a sudden and immediate threat in readiness to either fight, flight (run away) or freeze
- The fight and flight reactions are both activated by the sympathetic nervous system when we are confronted by a threat. Heart rate and breathing rate increases, the pupils dilate (to allow as much light as possible) and more blood is directed to the muscles, to prepare the body for either fight or flight
- When a threat is perceived, a signal is sent to the hypothalamus. This responds to the stressor by activating the sympathetic nervous system. The sympathetic nervous system then stimulates the adrenal medulla, which is the inner part of the adrenal gland. The adrenal glands then secrete hormones into the bloodstream. Two of these hormones are *adrenaline + noradrenaline*. These 'stress hormones' activate various organs including the heart, lungs, liver and kidneys, and resulting in the bodily changes that characterise the fight and flight reactions

Fight-Flight-Freeze Response

- If the threat is extremely overwhelming, or an individual can't run away or fight, the freeze reaction may kick in. In this state, heart rate and blood pressure drop, and muscles lose their tension
- This freeze state is considered to have adaptive value. For example, prey is less likely to be seen if it is frozen still. It is believed that the freeze state occurs when the parasympathetic nervous system kicks in just after the sympathetic nervous system, meaning both systems are highly aroused

Cortisol

- If the threat is not removed or dealt with quickly, more resources are needed, as the fight-flight response is short-term, and cannot be used over a prolonged period of time
- This is when cortisol is produced by the adrenal glands to try and deal with the stressor. Cortisol energises the body, allowing it to better deal with the stressor
- High levels of cortisol over a prolonged period of time can reduce the efficiency of the immune system

Gut-brain Axis (GBA)

- *"The gut–brain axis (GBA) as an area of emerging research, with reference to the interaction of gut microbiota with stress and the nervous system in the control of psychological processes and behaviour" (VCAA Study Design)*

- The GBA links the CNS + enteric nervous system
  - pathways between cognitive + emotional centres of brain → peripheral intestinal functions

- The human gut ***microbiota*** refers to a large population of bacteria that live in the gastrointestinal tract
  - changes to gut microbiota have effects on a person's health, nutrition + immunity

- Some studies suggest that a healthy microbiota produces important hormones + neurotransmitters
  - e.g. GABA, dopamine, serotonin
- Unhealthy microbiota can lead to negative effects including inflammation + the release of anxiety-producing hormones

Gut-brain Axis

- The relationship is *bidirectional*, meaning the gut microbiota can affect the brain, but the brain can also affect gut microbiota

- Gut microbiota → brain
  - alters levels of neurotransmitters
  - affects amygdala
  - neural plasticity

- Brain → gut microbiota
  - serotonin, dopamine, adrenaline all affect the gut
  - abnormalities in brain functions can lead to GIT issues
  - stress hormones shift gut microbiome

Selye's General Adaptation Syndrome (GAS)

- *"The explanatory power of Hans Selye's General Adaptation Syndrome as a biological model of stress, including alarm reaction (shock/counter shock), resistance and exhaustion" (VCAA Study Design)*

- A three-stage physiological response to stress that occurs no matter what the stressor is that is encountered. The GAS consists of three stages

Stage 1 – Alarm Reaction: This occurs when the individual first becomes aware of the stressor. At first, the body goes into a temporary state of *shock*, and it's ability to deal with the stressor decreases. The body then goes into *countershock*, during which the sympathetic nervous system is activated and the body's resistance to the stressor increases. Adrenaline is released and heart and breathing rate increases

Stage 2 – Resistance: If the stressor isn't dealt with, the resistance phase is reached. During the resistance stage, the body's ability to deal with the stressor rises above normal. *Cortisol is released into the bloodstream.* Minor sicknesses, such as colds, occur at the end of the resistance phase due to increased cortisol levels

Stage 3 – Exhaustion: If the stressor isn't removed, the body enters the exhaustion phase, during which its ability to deal with the stressor decreases. This is characterised by extreme fatigue and high levels of anxiety, and major illnesses such as heart disease

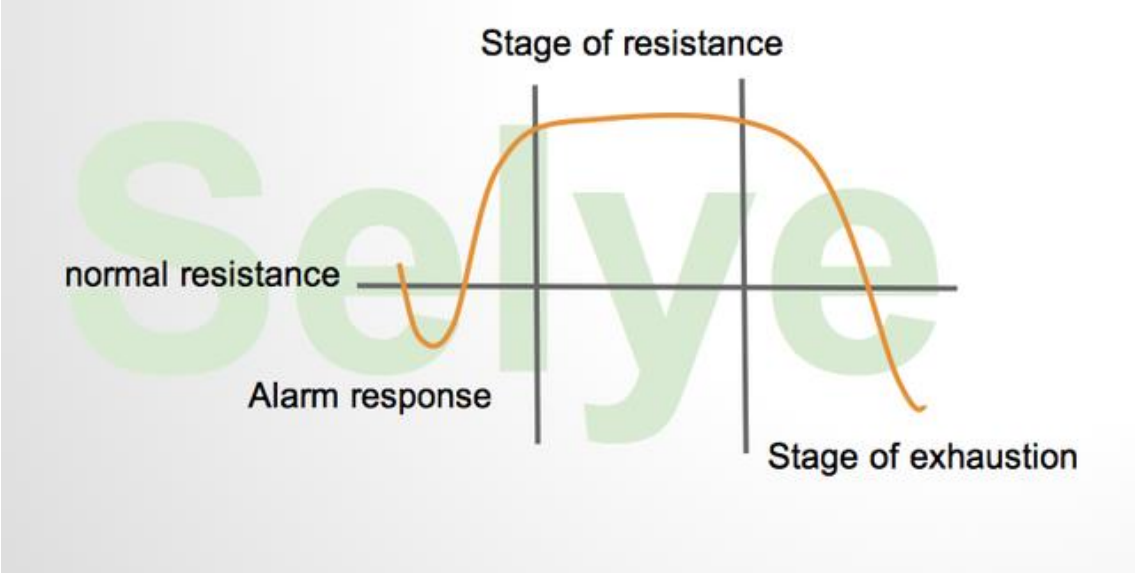
Selye's General Adaptation Syndrome (GAS)

Strengths:

- One of the first to link stress to disease
- Involved a clear three phases common to all stressors
- Incorporated an exhaustion phase

Limitations:

- Assumes everyone has exactly the same responses, which may not be true. 'One size fits all' model
- Doesn't take into account a cognitive viewpoint e.g. two different people may judge the same situation differently – stressful or not stressful
- Was tested on rats – may not be fully applicable to humans



Lazarus + Folkman's Transactional Model

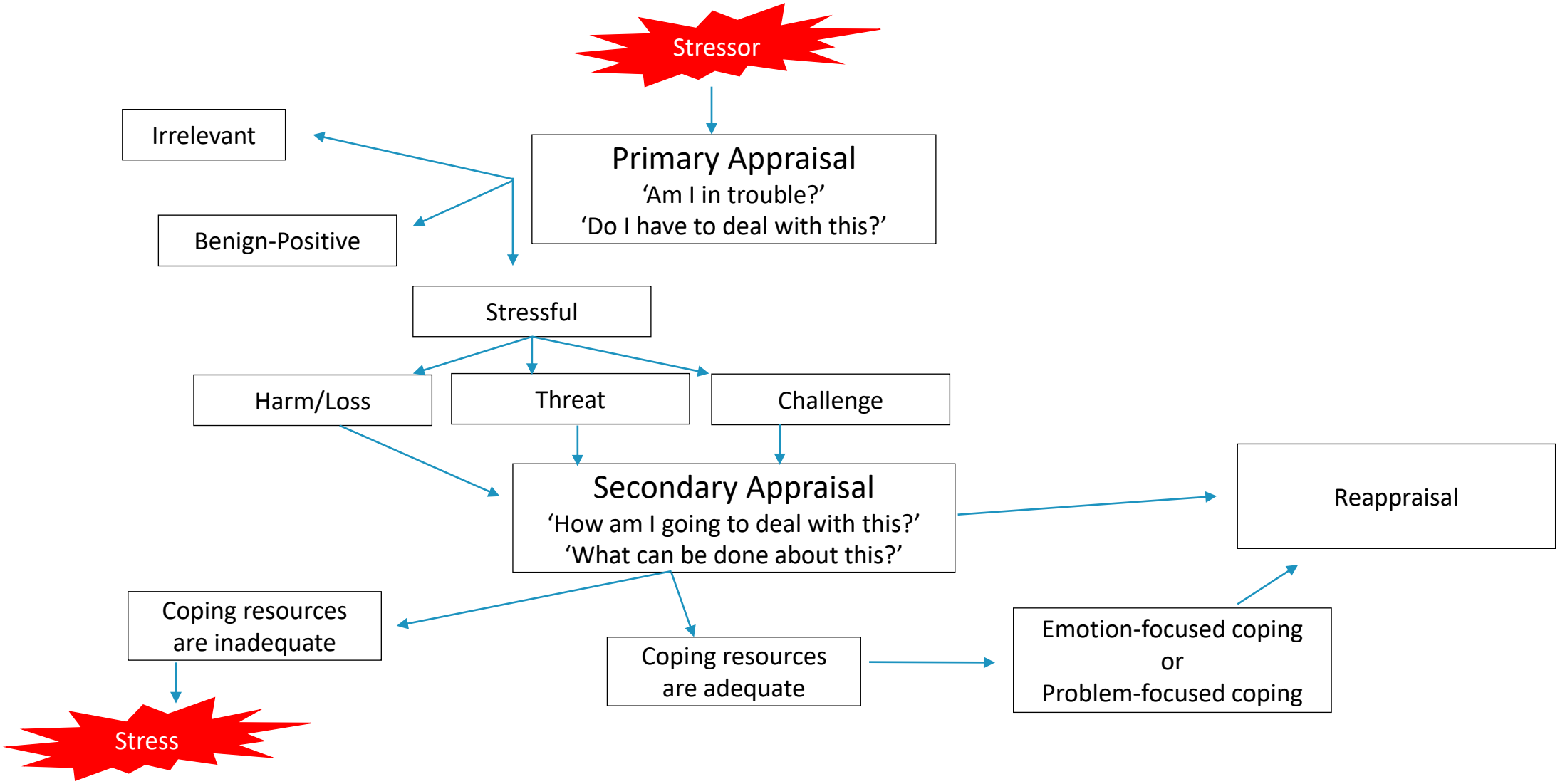
- *"The explanatory power of Richard Lazarus and Susan Folkman's Transactional Model of Stress and Coping to explain stress as a psychological process (primary and secondary appraisal only)" (VCAA Study Design)*

- There are many psychological factors that affect how an individual reacts to a potential stressor, including their prior experiences, attitude and coping skills

- The *Transactional Model of Stress and Coping* states that stress involves an encounter (or transaction) between an individual and their environment, and that a stress response depends upon the individual's appraisal of the stressor and their ability to cope

Stress

Lazarus + Folkman's Transactional Model



Lazarus + Folkman's Transactional Model

- In a primary appraisal, we evaluate the significance of the event.
  - Is it important? Do I have to deal with it?
- The outcome of the primary appraisal is whether the event is irrelevant, benign–positive or stressful
- If the situation is stressful, then more appraisal occurs to decide if the situation is harm/loss (e.g. I have lost my wallet), a threat (e.g. I might not be able to pay the bills) or a challenge (e.g. I'll learn to budget)
- In a secondary appraisal, we evaluate our coping options and resources, and our ability to deal with the stressor.
  - What can I do about this? What resources can I use to help me?
- If we have enough coping skills or resources, then stress may not occur. If we perceive the situation as too much for our coping skills and resources, then stress will occur.
- A reappraisal may be performed at different times if the situation or our ability to cope with it changes, as often happens

Lazarus + Folkman's Transactional Model

Strengths:

- Understands that each individual will react differently to a situation
- The individual has an active, rather than a passive, role
- Includes personal appraisals of a situation, which explains why people react in different ways to the same stressor

Limitations:

- Difficult to test through experimental research
- Primary and secondary appraisals are often undertaken simultaneously and can interact with each other. They are therefore difficult to isolate for study
- Doubt whether we actually need to appraise something as stressful to have a stress response

Coping with Stress

- *"Use of strategies (approach and avoidance) for coping with stress and improving mental wellbeing, including context-specific effectiveness and coping flexibility" (VCAA Study Design)*

Coping with Stress

- A coping strategy is a specific method that individuals use to manage the stress produced by a stressor. There are many different types of coping strategies

Context-Specific Effectiveness

- Context-specific effectiveness simply refers to the coping strategy 'matching' the stressor.
  - For example, if a student has a big test coming up, a coping strategy that incorporates positive action, such as study, would be effective. However, strategies such as mental distancing (not thinking about the test) will likely be ineffective.

Coping Flexibility

- Coping flexibility refers to an individual's ability to effectively change or modify their coping technique when necessary. People with a high coping flexibility are able to change their coping strategies if their current strategy isn't working. People with a low coping flexibility tend to stick to the same strategies across a number of situations, even if they are being proven ineffective. As expected, people with a high coping flexibility tend to handle stress more effectively

Approach and Avoidance Strategies

- Approach coping strategies involve direct efforts to confront a stressor and deal directly with it. Activity is focused towards the stressor.
  - For example, if stressed about an upcoming exam, an approach strategy would be to study harder and ensure that you are prepared

- Avoidance coping strategies involve efforts that evade a stressor and deal indirectly with it. Activity is focused away from the stressor.
  - For example, if stressed about an upcoming exam, an avoidance strategy would be to try and relax by catching up with friends, or preparing for the worst and not trying

VCAA 2017

Question 4

Glutamate plays a key role in synaptic plasticity by

A. releasing neurohormones into the bloodstream.

B. increasing the speed of neurotransmitter transmissions along the axon.

C. acting as an excitatory neurohormone released across the synaptic gap.

D. acting as an excitatory neurotransmitter released across the synaptic gap.

Learning

Classical Conditioning

- *"Behaviourist approaches to learning, as illustrated by classical conditioning as a three-phase process (before conditioning, during conditioning and after conditioning) that results in the involuntary association between a neutral stimulus and unconditioned stimulus to produce a conditioned response, and operant conditioning as a three-phase process (antecedent, behaviour and consequence) involving reinforcement (positive and negative) and punishment (positive and negative)" (VCAA Study Design)*

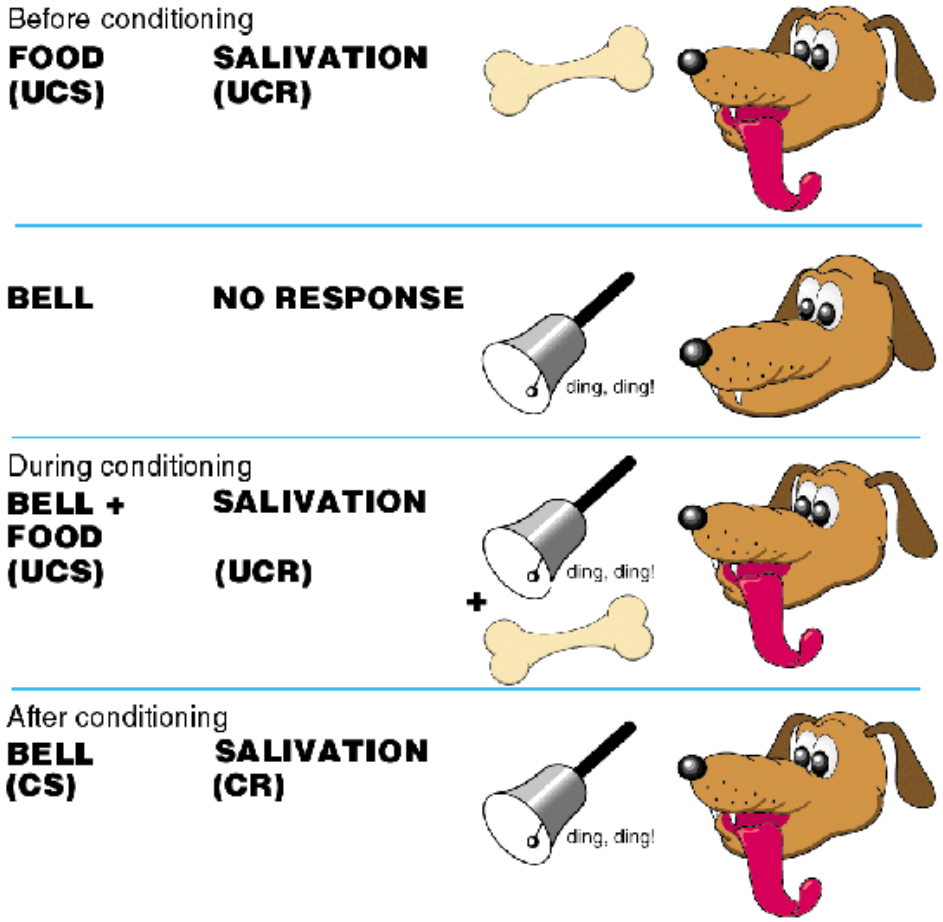
- Classical conditioning refers to a certain type of learning that occurs through the *repeated association of two or more different stimuli*.
- It was first described by Ivan Pavlov in his now famous 'Pavlov's Dog' experiment. In the experiment, Pavlov taught his dog to salivate at the sound of a bell.

- Classical conditioning involves three phases – before conditioning, during conditioning and after conditioning.

Classical Conditioning

- The **unconditioned stimulus** (UCS) is a stimulus that consistently produces a particular, naturally occurring, automatic response. Pavlov's experiment = food.
- The **unconditioned response** (UCR) is a reflexive, involuntary response that is predictably caused by the UCS. Pavlov's experiment = salivation by dog to the food.
- The **neutral stimulus** (NS) is a stimuli that does not produce a predictable response. Pavlov's experiment = bell.
- The **conditioned stimulus** (CS) is the stimulus that was neutral but, after conditioning, produces a response similar to the UCS. *The CS is the same thing as the NS.* Pavlov's experiment = bell.
- The **conditioned response** (CR) is the learned response that is produced by the CS. It is the same/similar to the UCR, but it is produced by the CS alone. Pavlov's experiment = salivation by the dog to the bell alone.

Classical Conditioning



Before:
UCS → UCR

During:
UCS + NS → UCR

After:
CS → CR

Operant Conditioning

- Operant conditioning is a type of learning where the consequences of a particular behaviour determine the likelihood that it will be performed again
- Operant conditioning theory proposes that a person / animal will tend to repeat a behaviour that has 'good' consequences, or that will enable it to avoid 'bad' consequences. Also, people will tend not to repeat a behaviour that has 'bad' consequences
- An operant is any behaviour that acts on the environment to produce some kind of consequence.
- Operant conditioning was extensively researched by B.F. Skinner, who did experiments with rats in a 'Skinner Box'

Operant Conditioning

- Operant conditioning is a three-phase model.

1. **Antecedent (A)**
   - A stimulus that occurs before the behaviour
2. **Behaviour (B)**
   - The voluntary behaviour by the individual that occurs due to the antecedent stimulus
3. **Consequence (C)**
   - The consequence of the behaviour. The consequence has an effect on whether the behaviour happens again

- A certain antecedent stimulus prompts a behaviour that is followed by a specific consequence

Operant Conditioning

Reinforcement occurs when a stimulus increases the frequency or likelihood of a response that it follows. A reinforcer is any stimulus that strengthens the likelihood of a response.

- A positive reinforcer is a stimulus that strengthens the frequency of a desired response. Positive reinforcement involves giving a positive reinforcer after the desired response has been given
  - Basically, a person/animal is given something desirable as a reward for doing something good, to encourage the behaviour in the future
  - e.g. giving a dog a treat when it sits, giving a child pocket money for doing their jobs

- A negative reinforcer is an unpleasant stimulus that, when removed, strengthens the frequency of a desired response. Negative reinforcement involves the removal of an unpleasant stimulus, in order to strengthen behaviour
  - e.g. using an umbrella to avoid the rain (negative reinforcer). The umbrella removes the rain, therefore, you are more likely to use the umbrella again. E.g. taking a Panadol – removes the pain

All reinforcement aims to strengthen behaviour. They are only ever used after the correct behaviour is made. Positive reinforcers are given, negative reinforcers are removed

Operant Conditioning

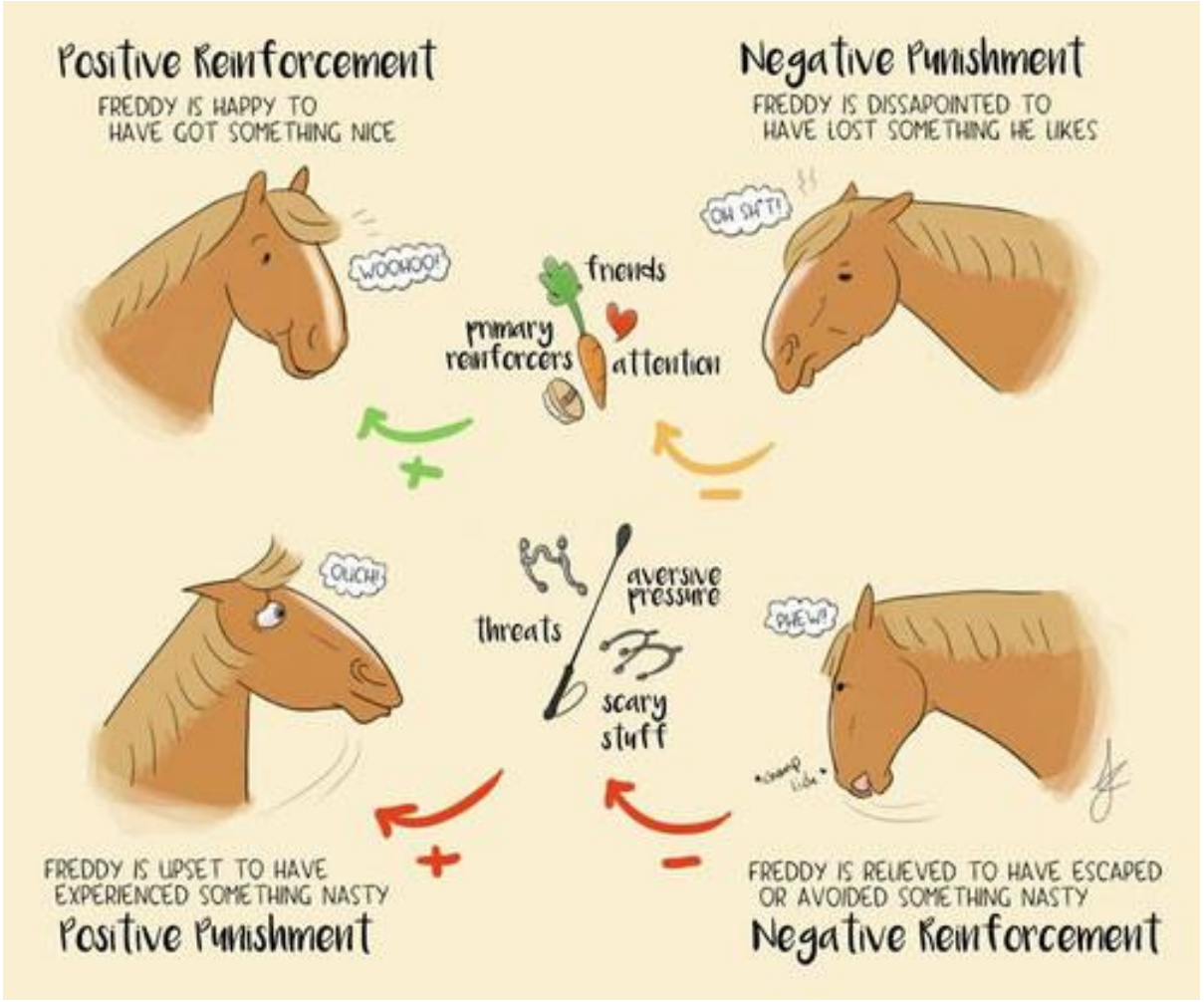
Punishment is the delivery of an unpleasant consequence following a behaviour, or the removal of a pleasant consequence following a behaviour

- Positive punishment involves the introduction of a stimulus, thereby weakening the likelihood of the behaviour occurring again
  - e.g. running extra laps due to being late to training, being given extra chores at home for back-chat

- Negative punishment involves the removal or loss of a stimulus , which weakens the likelihood of a response occurring again
  - 'Do something wrong, get something taken away'
  - e.g. losing your mobile phone as a punishment
- Response cost is often used interchangeably with negative punishment. The 'response cost' is the thing that is lost due to negative punishment

All punishment aims to weaken the behaviour

Operant Conditioning



Differences between CC + OC

Operant Conditioning:

- Usually voluntary response
- Learner is active
- Consequence determines whether behaviour is strengthened or weakened

Classical Conditioning:

- Involuntary reflex response
- Learner is passive

Observational Learning

- *"Social-cognitive approaches to learning, as illustrated by observational learning as a process involving attention, retention, reproduction, motivation and reinforcement" (VCAA Study Design)*
- Observational learning occurs when someone uses observation of a model's behaviour, and the consequences of that behaviour, to guide their own future behaviour. A model is who or what is being observed. Observational learning has been researched and described by psychologist Albert Bandura
- Observational learning is particularly used by children, who often look to adults to guide their behaviours
- Vicarious conditioning is when an individual watches a model's behaviour being either reinforced or punished, and modifies their behaviour accordingly
- Vicarious reinforcement occurs when a model's behaviour is reinforced, and therefore increases the likelihood of the observer behaving in a similar way
- Vicarious punishment occurs when a model's behaviour is punished, and therefore decreases the likelihood of an observer behaving in a similar way

Observational Learning

- According to Bandura's theory, there are five processes involved in observational learning.

1. Attention

- In order to learn through observation, an individual must pay close attention to a model's behaviour and the consequences of that behaviour. Attention can be influenced by interest levels, the situation and perceptual capabilities. People tend to pay closer attention to models that are similar to themselves, are well liked and have a high status

2. Retention

- An individual must be able to accurately remember the model's behaviour. The more meaningful an individual can make the memory of the observation, the more closely they will be able to replicate it when necessary

3. Reproduction

- An individual must have the ability to put into practice what they observed. Obviously, you usually can't watch someone and then reproduce the behaviour perfectly, or else everyone could be champion sportspeople!

Observational Learning

4. Motivation

- The individual must be motivated to perform the behaviour they observed. Generally, there needs to be an incentive for observing and performing the behaviour.

5. Reinforcement

- The reinforcement of the behaviour influences the motivation of whether to reproduce that observed behaviour. Reinforcement can be of both when you perform the behaviour and when the model performs it.

Learning

VCAA 2013

Harry bought a complicated new home entertainment system. He did not know anything about electronics. He tried randomly connecting different pieces of equipment until eventually the system worked. Five-year-old Max watched his father, Harry, connect the equipment. A week later, when the family moved to a new house, the home entertainment system was taken apart. At the new house, Max was quickly able to reconnect the entertainment system.

Question 30

Max's learning is best described as

A. shaping.
B. classical conditioning.
C. observational learning.
D. trial-and-error learning.

Learning

ATSI Ways of Knowing

- *"Approaches to learning that situate the learner within a system, as illustrated by Aboriginal and Torres Strait Islander ways of knowing where learning is viewed as being embedded in relationships where the learner is part of a multimodal system of knowledge patterned on Country" (VCAA Study Design)*

- *Situated learning theory* emphasises that learning should take place in the same context where it would be applied, enabling individuals to practise what has been learnt

- Situated cognition provides a model of learning that is more communal + collaborative – the learner is in a system with particular knowledge
  - learning occurs via observation + imitation of actions of other members of the system
  - learning is more unstructured + less rigid
  - emphasis is on mastering context-specific skills rather than rote learning information

Learning

ATSI Ways of Knowing

- Aboriginal and Torres Strait Islander ways of knowing refer to the sophisticated methods of learning based on traditions + culture of First Nations Australians.
- Methods involve deep respect for the context of learning + the relationship with land and Country.

Memory

- *"The explanatory power of the Atkinson-Shiffrin multi-store model of memory in the encoding, storage and retrieval of stored information in sensory, short-term and long-term memory stores" (VCAA Study Design)*

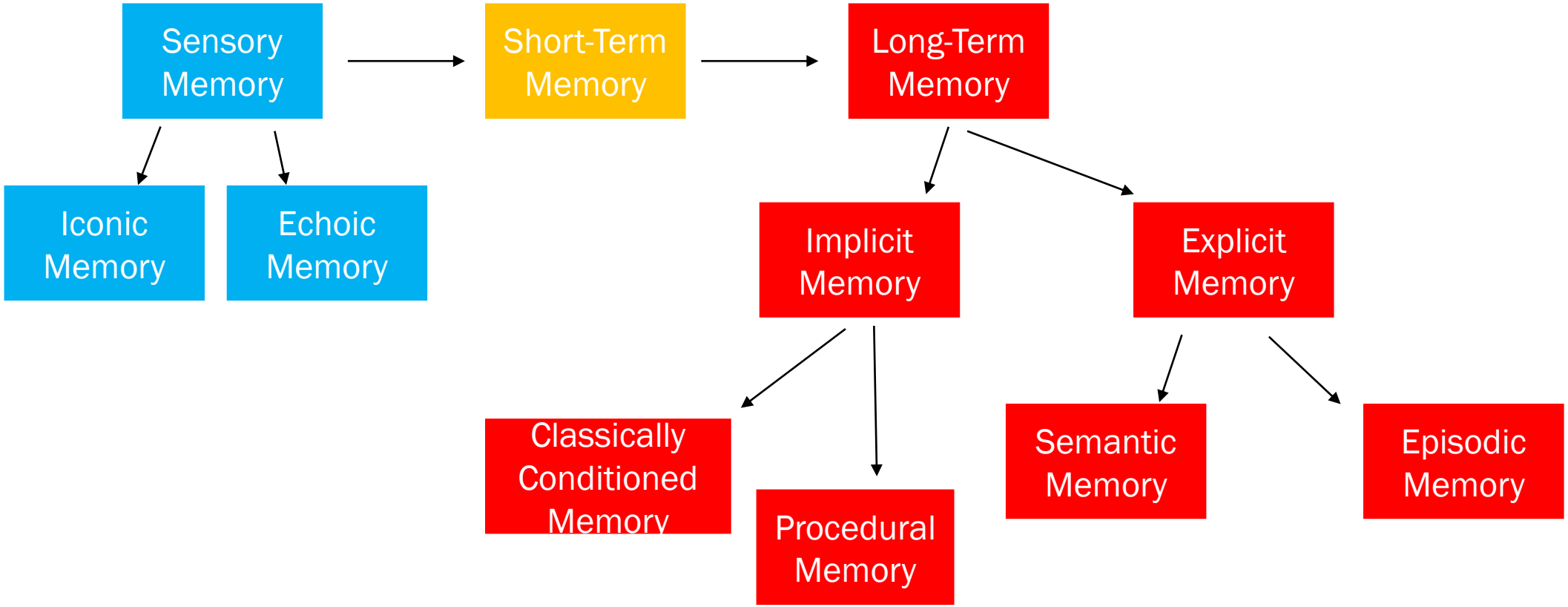
- Memory can be defined as the processing, storage and retrieval of information gathered through learning

- There are many different models that attempt to explain human memory. Despite their differences, all models tend to include three key processes – encoding (the conversion of info into a usable form so it can be stored), storage (retaining the information) and retrieval (recovering the information when necessary)

- We specifically look at the Atkinson-Shiffrin multi-store model of memory

Memory

Atkinson-Shiffrin Multi-store Model of Memory



Atkinson-Shiffrin Multi-store Model of Memory

- The Atkinson–Shiffrin model represents memory as consisting of three separate stores, called *sensory memory*, *short-term memory* and *long-term memory*. Each store has a different function, and has a different capacity and duration

- Sensory memory is the entry point of memory, where new, incoming sensory information is stored for a very brief period of time

- Sensory memory is divided into two different parts – iconic memory and echoic memory.
  - Iconic memory refers to visual sensory information, which is stored for between 0.2-0.4 seconds.
  - Echoic memory refers to auditory sensory memory, which is stored for 3-4 seconds, to allow us to make sense of speech

- We are not consciously aware of most of the sensory information in sensory memory. It is there just long enough for us to select what information to pay attention to. If we don't pay attention to information in sensory memory, it is lost. If we do, it is transferred to short-term memory (STM)

Atkinson-Shiffrin Multi-store Model of Memory

- Short-term memory is a memory system where information is stored for a short period of time. Short-term memory is the place where all conscious reasoning, thinking and planning takes place
- Information is transferred into short-term memory from sensory memory, but can also be retrieved from long-term memory
- The duration of STM is generally between 12-18 seconds, although it can be up to 30.
- STM also has a very limited capacity. It can store 'seven plus or minus two items', depending on the individual and the situation. In other words, it can store between 5-9 items. Information is lost from STM due to decay (not being used) or displacement (being pushed out due to too many items)
- STM is also known as 'working memory', due to the fact that conscious work is believed to occur in STM

Atkinson-Shiffrin Multi-store Model of Memory

- Long-term memory (LTM) stores a potentially unlimited (capacity) amount of information for a very long time, perhaps forever (duration)
- There are different types of LTM, which are associated with different types of memory
- Explicit memory involves memory that occurs when information can be consciously retrieved. It is also known as *declarative memory*
- Episodic memory is the memory of events that you personally experienced. Memories can includes details like time and place. It is a type of explicit memory
- Semantic memory is the memory of facts and knowledge about the world, including general knowledge and the meaning of words. It is a type of explicit memory

Atkinson-Shiffrin Multi-store Model of Memory

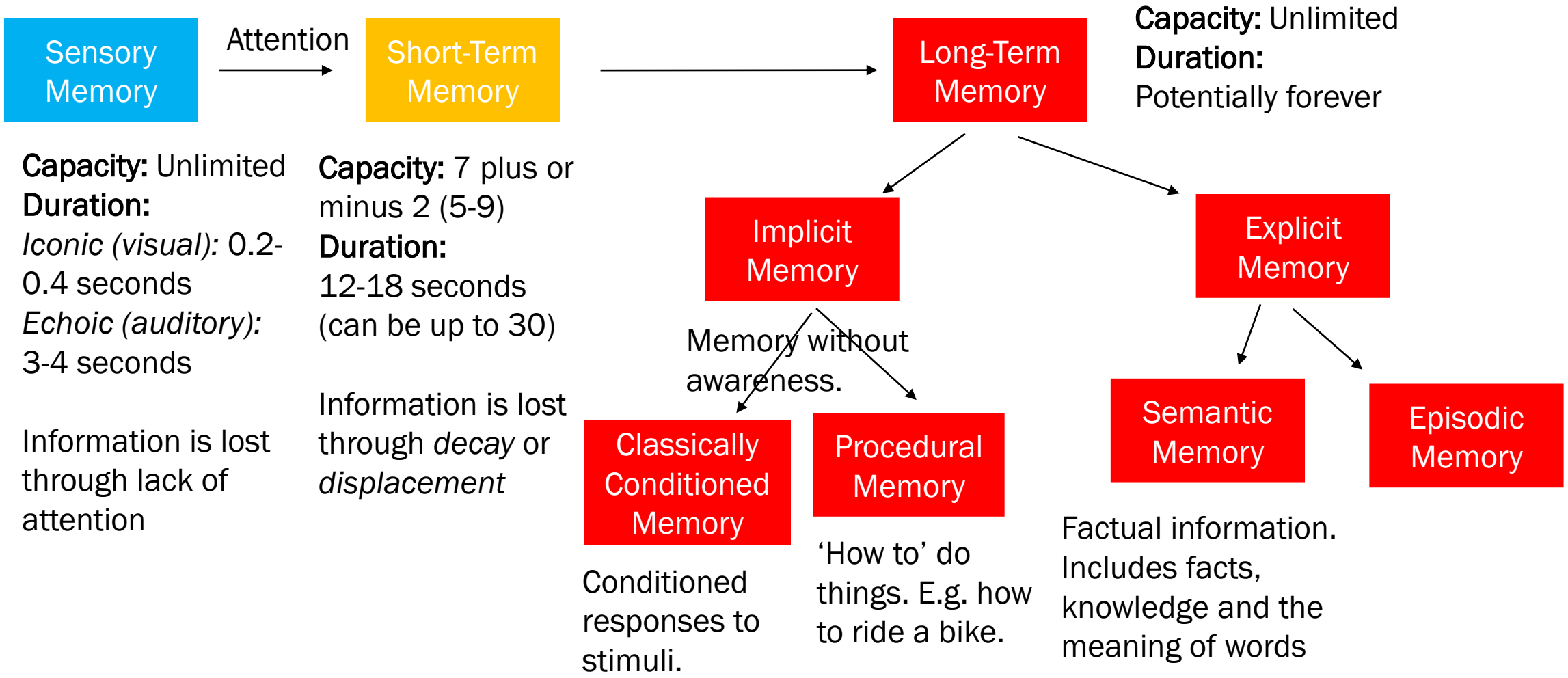
- Implicit memory involves memory that doesn't require conscious retrieval. Individuals are not aware they are remembering something.

- Procedural memory is the memory of motor skills and actions that have previously been learnt. 'How to do something'.
  - E.g. how to ride a bike, how to brush your teeth.
- It is a type of implicit memory

- Classically conditioned memory involves conditioned responses to certain stimuli. It is a type of implicit memory.

Memory

Atkinson-Shiffrin Multi-store Model of Memory



Memory

Brain Structures

- *"The roles of the hippocampus, amygdala, neocortex, basal ganglia and cerebellum in long-term implicit and explicit memories"(VCAA Study Design)*

- Long-term memories are *not stored in any one brain location*, but stored across multiple spots of the brain

- The ***cerebral cortex*** is the wrinkly outside layer of the brain. It is connected to virtually all parts of the brain. The neocortex is the largest part of the cerebral cortex

- Long-term explicit (semantic + episodic) memories are distributed throughout the neocortex

- Different parts are generally stored in the area of the neocortex where the relevant information was first processed
  - For example, a memory of an AFL football match you attended might have the roar of the crowd (auditory info) stored in the auditory cortex in the temporal lobe, the sight of a goal being kicked (visual info) stored in the visual cortex in the occipital lobe and the names of the teams (language info) stored in the frontal lobe

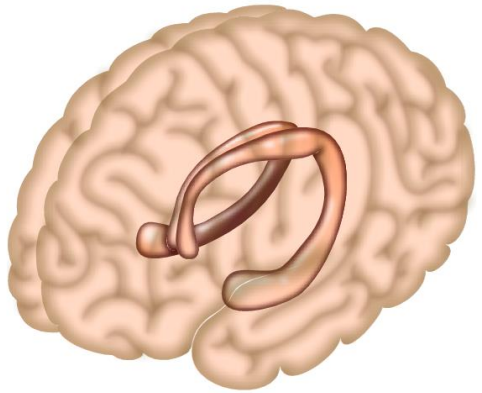
Memory

Brain Structures

- The hippocampus is located in the temporal lobe. We have two, one in each hemisphere of the brain

- The hippocampus is the part of the brain responsible for *turning short-term memories into long-term memories*. It is vital in the consolidation of new explicit (semantic and episodic) memories so that they are stable and long-lasting.
- However, it is not directly involved in the formation of implicit memories (procedural and classically conditioned)

- The hippocampus *doesn't actually store any long-term memories*. After they have been consolidated, they are transferred to the cerebral cortex, where they are then stored. The hippocampus is also important for spatial memory, such as routes while driving a car



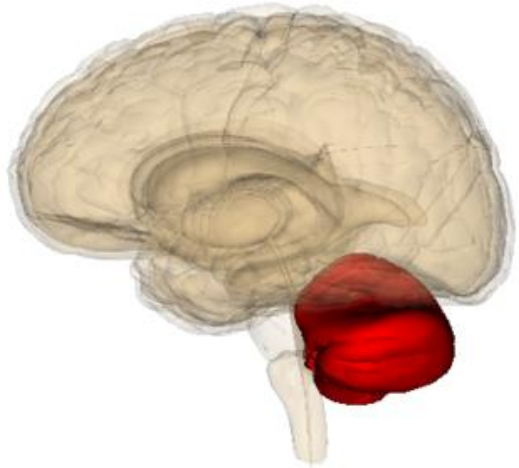
- The amygdala plays a crucial role in processing our emotional responses
- The amygdala is involved in the formation of *emotional memories*. People or animals without an amygdala, or with a damaged amygdala, are generally unable to acquire a fear response
- People are more likely to remember events that produce strong emotional reactions. During high emotional arousal, noradrenaline is released at the amygdala. This is believed to stimulate the amygdala to signal to the hippocampus that stronger encoding is needed
- Although the amygdala is important is the formation of emotional memories, it *doesn't store* them

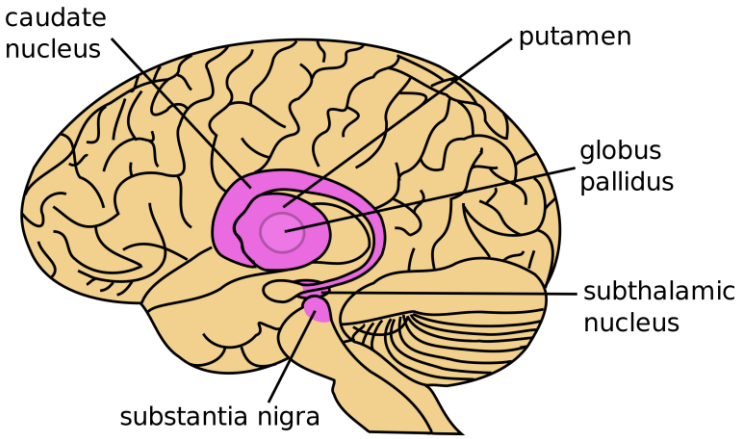
Memory

Brain Structures

- The cerebellum is involved in the encoding and *storage* of implicit memories. It is vital for the learning and execution of motor skills

- The basal ganglia is involved with *implicit memory*, particularly memories associated with building habits + motor memories.
  - the caudate nucleus assists in formation of memory associated with operant conditioning





Use of Memory

- *"The role of episodic and semantic memory in retrieving autobiographical events and in constructing possible imagined futures, including evidence from brain imaging and post-mortem studies of brain lesions in people with Alzheimer's disease and aphantasia as an example of individual differences in the experience of mental imagery"(VCAA Study Design)*

- Both episodic + semantic memories are involved in retrieval of autobiographical events
  - episodic = emotions, thoughts, senses
  - semantic = general knowledge, who / what / when / where / why

- Regions of the brain activated when imagining the future are very similar to those activated when retrieving memories of the past
  - episodic memories → attach emotions + senses to an imagined future
  - semantic memory → attach general facts + knowledge to an imagined event

- We can use information from the past to construct our vision of the future

Alzheimer's Disease

- Alzheimer's disease is a type of dementia. It is characterised by the *widespread deterioration of brain neurons*, which causes memory decline, gradual loss of cognitive and social skills and changes in personality

- Loss of STM is usually one of the first symptoms of Alzheimer's, as it causes the brain to shrink. Later on, long-term memories are also impaired, particularly explicit memories. In the later stages of the disease, people may be unable to recognise family and have major changes to personality, often becoming aggressive.
- The major risk factor for Alzheimer's is increasing age, and there is no cure

- Currently, an accurate diagnosis can only be made ***after death***. Post-mortems reveal:
  - brains that are severely shrunk due to the death of neurons. The medial temporal lobe, particularly the hippocampus, is most affected, with up to ¾ of neurons lost
  - a build-up of amyloid plaques, which are a hard protein that form around neurons, therefore reducing or stopping communication between them
  - structures known as 'neurofibrillary tangles' that occur within neurons, inhibiting transport of essential substances
  - low level of the neurotransmitter acetylcholine (Ach)

Aphantasia

- *Aphantasia* is a disorder that involves being unable to visualise imagery
- Recalling an autobiographical events consists of listing facts, rather than being able to create a mental picture of the events that occurred
- May involve difficulty with navigation + spatial memory, and recognising faces

Mnemonics

- *"The use of mnemonics (acronyms, acrostics and the method of loci) by written cultures to increase the encoding, storage and retrieval of information as compared with the use of mnemonics such as sung narrative used by oral cultures, including Aboriginal peoples' use of songlines" (VCAA Study Design)*

- Mnemonics refer to techniques that help an individual recall something
- **Written cultures**
  - *Acronyms*
    - first letters from multiple words to form a new word that's easier to remember
    - e.g. SAME = sensory - afferent, motor - efferent
  - *Acrostics*
    - phrases made up of words beginning with the first letters of the words you want to remember
    - e.g. Never Eat Soggy Weet-Bix = North, East, South, West
  - *Method of loci*
    - memorising information through placing each item along an imaginary journey
    - combines visualisation with spatial memory of environments that are familiar to the individual

- *Oral cultures*
  - *Sung narratives*
    - singing allows us to create bigger chunks of information that can be stored in STM
    - auditory aspects of songs aid in encoding as the individual associates words with a certain beat, tempo or melody

- *Songlines* are memory codes used by Aboriginal and Torres Strait Islander people that trace journeys + describe how a traveller should respectfully make a journey across Country
  - describe landmarks
  - by giving landmarks characteristics within the song, encoding is enhanced further

VCAA Sample Exam (2017)

Question 28

Which one of the following statements about short-term memory is most accurate?

A. Short-term memory holds only information transferred from sensory memory.

B. All incoming information is held in short-term memory for approximately 30 minutes.

C. Short-term memory holds all sensory information until it is encoded into long-term memory.

D. Short-term memory holds a limited amount of encoded information while it is being processed.

Memory

VCAA 2017

Question 5

The areas of the brain that are associated with memory and are most likely to be affected by Alzheimer's disease are the

A. hippocampus followed by the cerebral cortex.

B. cerebral cortex followed by the hippocampus.

C. cerebellum followed by the hippocampus.

D. cerebellum followed by the amygdala.

All Done!

- Thanks for coming!

- Good luck with Psychology and all of your studies this year!!!